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ABSTRACT

The use of quantitative approaches to the management of higher education and implications for legislative concerns are considered. Among the new developments and practices that illustrate the use of quantitative approaches to management are the following: basic structures for categorizing programs and activities for reporting and analysis; procedures for determing unit costs; financial reporting and audit guidelines; and use of measures of outcomes of higher education. Major categories of legislative concern are that: higher education institutions be run efficiently; higher education institutions have effective and relevant programs; institutions and programs needing funding be identified; and the degree of state support for postsecondary education be determined relative to other state priorities. It is noted that efficiency does not indicate program effectiveness, and that quantitative approaches may indicate the efficiency of an institution, but not how to make an institution more efficient. It is suggested that quantitative approaches to assessing opinions about value, success, and satisfaction with programs may help decision-makers in judging program effectiveness. It is claimed that quantitative approaches have helped very little, except in improving basic data, in determining what should be funded and to what extent. The future possibility of having an access to a higher education rate, a scholastic achievement rate, a cost of education rate, and other types of indicators is noted to stimulate thinking about additional options. (SW)

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QUANTITATIVE APPROACHES TO HIGHER EDUCATION MANAGEMENT

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QUANTITATIVE APPROACHES TO HIGHER EDUCATION MANAGEMENT: AN ASSESSMENT OF UTILITY TO LEGISLATIVE CONCERNS

G. Ben Lawrence

While higher education administrators have always planned programs, allocated resources, and prepared budgets, relatively plentiful resources reduced the need for making truly difficult decisions. Until the mid 1960's higher education was a steadily expanding enterprise, and the expansion was accompanied by new dollar resources. It was relatively easy to make necessary changes and additions to higher education programs to meet the needs of a changing society in that expansionary period. But in the late 1960's that situation commenced to change. Enrollment growth began to taper off. A weak economy resulted in a scarcity of resources. The love affair between the public and higher education turned to wariness and skepticism. Planning, budgeting, and resource allocation became much more complex and difficult. Tough decisions and trade-offs had to be made. In order to respond to critics, cope with economic forces, document both needs and effectiveness, and to find a basis for tough decisions, administrators began to reconsider the academic world's traditional skepticism about the place of management in higher education. In the process of this reconsideration, quantitative approaches to management began to emerge.

The use of quantitative approaches to management has increased dramatically in the ten years since 1967. Indeed, the litany of new developments and practices is impressive. To mention a few:

- The development and use of a common data language are well underway.
- Basic structures for categorizing programs and activities for reporting and analysis have been developed and are in use.
- Procedures for determining unit costs have been developed and are in use.
- Financial reporting and audit guidelines have been developed and adopted.
- Research and development on understanding the measures of outcomes of higher education are beginning to show evidence of practical application.
- Computer supported information systems have improved dramatically, and their use is widespread.
- Now that institutions have achieved some reasonable progress in the use of quantitative approaches, state agencies of higher education are in a position

to develop and, in fact, are developing their own information bases and quantitative methodologies to support their decision-making.

If development and use were the only criteria to be used in assessing the progress and utility of quantitative approaches to management in higher education, the results would be clear. Use has increased dramatically, and most experts predict this trend will continue.

However, use by itself does not illuminate the more fundamental question: does use of these tools and techniques yield better decisions and more capably managed institutions? We do not have a definite answer to this question. While managers who use such techniques seem to feel better about their decisions, it is hard to ascertain whether decisions are better or whether they would have been made differently without such techniques.

In some cases, the new tools and techniques are clearly assisting: data element dictionaries, induced course load matrices, facilities management manuals, etc. But in other cases the utility is not so clear cut.

The problem is best illustrated by a specific example. During the 1960's legislators and others became increasingly frustrated by requests for more and more money to meet rising costs and started requesting, demanding, more incessantly to be provided with cost information. The sort of unit-cost information they wanted was originally developed in industry to be used in association with product specifications and potential sales information to determine production levels and pricing of products. The transfer of this concept to higher education has not worked out very well because the two situations are not the same.

Unit costs in higher education have been equated with cost per student in a particular discipline or program. The assumption is that the student (or a graduate) is the product to be produced. While it is true that students do graduate, it is not true that institutions produce graduates, especially to some predetermined set of specifications. The facts are that institutions provide instructional and learning services to students. Students use these services, and, if they have the ability and motivation, *they* meet (the institution does not produce) graduation requirements.

The use of unit-cost information has had its impact, but it is not clear that the decisions have been better. Costs have been rising as clearly demonstrated by the cost per student over the past ten years. Pressures to check the rising costs eventually lead to a gradual change in the typical student-faculty ratio of about 15:1 to approximately 20:1 because this was the most effective way to impact the cost per student number. The difficulty with that decision is that we do not know and may not know for many years its real impact. The unit-cost number

concept assumes that the institution produced the same number of graduates at the same level of specification at a lower cost. In actuality the same number of students got less service as they attempted to meet graduation requirements. While students still graduate at the same rate, we do not know what the loss in service meant to their intellectual growth. We also have suspicions that grades have been inflated and graduation requirements eased. What is the long-range impact of this decision? In the case of industry the impact of such a decision is clearly shown in the profit and loss statement. In higher education it may never be determined except in subjective ways. In 1976 and 1977 the United States had nearly clear sweeps in Nobel Prize winners, the results of education from twenty and thirty years ago. Perhaps twenty and thirty years from now we may obtain some insight about the impact of the decisions made recently as we utilized unit-cost information.

The point of that example was, of course, that in some cases quantitative techniques and tools have been transferred to higher education from other sections of society without sufficient adaptation for us to be able to determine their utility. While we must seek new approaches to management, whether entirely new or adapted from other sectors of society, the concept employed must be compatible with the realities of higher education's purposes and processes.

Turning from this brief general assessment, I would like to comment on implications for legislative concerns. Of course, legislators have many and varied concerns related to higher education. To simplify this discussion I mention four major categories of concern:

- Higher education institutions should be run efficiently; resources should not be wasted.

- Higher education institutions should have effective and relevant programs. That is, its programs should be of significant value.

- How can we ascertain more effectively what is to be funded? (Public institutions, private institutions, community colleges, universities, etc; instruction, research, public service; liberal arts, education for work, professional manpower?)

- How much support should be provided by the state for post-secondary education relative to other state priorities?

With regard to the first, "Higher education should be run efficiently," quantitative approaches are available and in use in many places that address the efficiency question at least as a comparative measure among institutions. However, two important caveats are necessary lest someone announce to the

world that we can now make institutions efficient. First, efficiency does not speak to effectiveness. An institution may be run efficiently, but its programs may not be very effective. Secondly, quantitative approaches may give us an understanding of how efficient or inefficient an institution is, but they will not tell us how to make an institution *more* efficient. Quantitative approaches may indicate that a particular program is inefficient (operating say at a student-faculty ratio of 3:1), extremely expensive, and quite inappropriate. But if the faculty are all tenured, there may be little that can be done, and quantitative approaches do not resolve those social and legal problems.

Regarding the second category, "Higher education should have effective and relevant programs," at the current moment quantitative approaches have done little more than assist with the provision of basic statistics in program review. But research done during the past eight years now shows potential payoff. Effectiveness and relevance in the final analysis gets down to opinions about value, success, and satisfaction. Quantitative approaches to assessing such opinions show promise of assisting decision-makers with judgments concerning the effectiveness of programs. Outcome-oriented planning, needs assessment, and evaluation are still in their infancy, but show substantial promise.

With regard to the last two concerns, other than an improvement in basic data, quantitative approaches have helped very little. However, as basic data have improved, the potential has increased substantially for quantitative approaches that convert that data into information very useful for the kinds of decisions that stem from these concerns. For example, much of the basic groundwork has been laid for the development of indicators of higher education, indicators somewhat analagous to economic and social indicators. Unemployment, inflation, and prime interest rates among others, are useful indicators in establishing economic and social policy. True, we have arguments over what ought to be appropriate levels of unemployment if inflation is to be checked, but the indicators provide us with pertinent information relative to the debates and the formulation of policy.

Taking a very imaginative stance for a moment, imagine an access to higher education rate, a scholastic achievement rate, a cost of education rate, a first employment rate, and others. Such indices would be helpful in considering policy decisions associated with the last two concerns.

Can you imagine the impact on legislators if the following report appeared in the local paper:

"Students' Access to College Down 8.2 Percent! The state's higher education agency issued its semi-annual report on the condition of higher education today. Students' access to college dropped 8.2 percent in the last six months, down from 44.2. Hardest hit were black students dropping a big 12 percent. While

several factors were cited to explain these drops, the major factor appears to be the cost of education to the student. The cost of education index rose *9 percent* in community colleges, *7 percent* in state colleges and universities, and *4 percent* in private colleges and universities. While the cost of education to the student increased dramatically, student financial assistance levels remained constant providing no relief to the students to offset the increased cost.

"Two reasons were given for the excessive impact on black students: a larger percentage of black students come from low income families that cannot absorb additional cost increases, and a larger percentage of black students attend community colleges where cost increases were the greatest.

"This bad news comes at a time when demand for college trained people is the highest in three years as reflected by the first employment rate now at 97.3 percent. This indicator shows the percentage of students gaining employment in their field of training within three months of graduation. In addition, the scholastic achievement rating has increased 3 percent in the last six months suggesting improved vitality in educational programs and increased motivation on the part of students.

"Senator Jerome Abernathy, Chairman of the Senate Education Committee, was asked to comment on the report. He said, 'I am very pleased with the demand for college trained people. This demonstrates that our colleges are turning out well-trained and well-qualified young people. But I am distressed at the cost-of-education increase and the drop in the access rate. You can be sure that the Senate Education Committee will be investigating these matters to determine what can be done.' "

My illustration may be excessively imaginative, but it is not totally unrealistic. This concept has been envisaged for at least five years. Work has been steadily underway. Today substantial interest in the development of indicators of higher education is evident. Theoretically, the task is achievable and the benefits seem obvious. Practically, the task is difficult and will be some time in coming.

Higher education has taken seriously the use of quantitative approaches to its management. Thus far the impact has been mixed, but as understanding develops and use continues, there appears to be promise that such approaches will serve to assist decision makers and policy makers in significant ways.

Information is needed whereby legislators can substantiate the budgetary requests of higher education institutions within a state such as:

1. *Enrollment data that reflects local economic and growth patterns rather than national patterns.*

2. *Data with regard to the cost effectiveness of faculty spending time on research and graduate teaching rather than on undergraduate teaching.*

3. *Budgetary formulas for use by legislatures that will take into account the diversity and differences of programs both within and between institutions so that allocations can be made fairly and equitably.*

The Honorable Frank Felix
Senator, Arizona Legislature

A survey of legislators in ten southeastern states indicates the following ways to provide to legislators information about education problems and programs.

1. *Higher education must be responsive to the needs of the community served, these needs must be made known, and legislative help requested to solve the problems in meeting these needs.*

2. *Higher education must identify its successes and advertise them – publicizing the programs without listing the shortcomings.*

3. *Higher education should help legislators make decisions by providing meaningful, well prepared and efficient information.*

4. *Higher education should participate in pressure politics by recruiting in the communities served.*

5. *Higher education should know the community and let the community know about itself.*

6. *Higher education must advertise the availability of its services.*

George Lepchenske, Assistant Dean
Mohave Community College